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ABSTRACT

This report summarizes the problems schools are encountering as they try to use data to gauge the effectiveness of standards-based education, accountability efforts, and school reform. It provides an overview of the education market, discusses the strengths and weaknesses of available software, and describes systems used by 19 states. The article looks at the use of technology in schools and the market opportunities that are developing as more school systems are recognizing the importance of administration software. It compares the various types of software applications that are available in the administrative technology market, most of which can be categorized as student-information systems, school-administrative systems, or classroom-management tools. These kinds of software are being driven by macro trends resulting from the need to evaluate changes in standards, accountability, school improvement, and technology. The report states that this market reality will push school administrators toward the use of products that can meet all these needs in one streamlined system. It discusses some of the companies that dominate the market and supplies the names of some of the smaller companies that offer student-information systems. The report concludes with a short review of the states that use integrated administrative software. (Contains 17 references.) (RJM)

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Data Collection and Use in Schools

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Introduction

By Joann Sebastian Morris

Nationally and across the Pacific, standards-based education, accountability, and school reform have increased schools' reliance on data collection. However, there are indications that many schools are not yet engaging in data-driven decision making. School systems are purchasing software for instructional purposes, but they lag behind in using administrative technology.

Schools' ability to make use of data is further complicated by decentralized decision making. Some states control data collection across district school systems, but these states are few in number. In most states, districts or even local schools have the ability to choose and purchase software to gather data on students and teachers. The incompatibility of education technology tools limits sharing across systems or even across states without duplicate entries.

Chenoa Farnsworth's *Data Collection and Use in Schools* contains a concise and timely summary of research on these and related topics. She provides an overview of the education market, discusses the strengths and weaknesses of available software, and describes systems used by 19 states. Such valuable information is not readily available to the public; hence our desire to share the report widely. Educators interested in establishing or improving their own data collection and management system will benefit from the information that follows.

Market Trends

Data Collection

The collection of data in schools has become pervasive over the last decade. According to the National Education Association (NEA), although most schools collect data, experts agree that few schools are effectively utilizing it (2001). The majority of data collected includes student information, testing results, teacher information, teacher evaluations, and facilities information. Despite the collection of such extensive data, schools tend not to be "data-driven" organizations. According to

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the NEA, data-driven decision making falls into four categories:

1. Mining the data: collecting and managing pertinent data and information;
2. Analyzing the data: analyzing and synthesizing the data to create knowledge;
3. Communicating the data: reporting data, information, and knowledge to support organizational learning;
4. Using the data: maximizing the role of data in school improvement planning.

Many schools are competent at step 1 in the process—mining the data—but fail to complete the additional three steps to become truly data-driven organizations. Due to increased pressure on schools to be accountable for their results, it is pertinent for schools to become competent at utilizing the data collected to make informed decisions and improve school performance.

Standards

The movement to set challenging academic standards and make them the centerpiece of state education systems is now firmly in place in virtually every state. All but one state (Iowa) have set statewide standards outlining what students should know and be able to do in core subjects; 48 states have developed or adopted tests to measure whether students are attaining the standards, and more than two-thirds of the states have in place at least some method of holding schools accountable for results (Achieve, 2001).

In addition to subject matter testing, the use of high-stakes standardized testing is also increasing. High-stakes testing is used to determine whether or not a student will progress to the next grade or graduate from high school. Although high-stakes testing has been controversial, *Public Agenda* reports in its recent Reality Check 2001 survey that public opinion regarding these tests is changing. The report indicates that parents, teachers, and students do not voice significant dissatisfaction with the high-stakes testing in their schools.

The move towards standards driven education has led to increased use of school-based data to assess a school's effectiveness. Schools are now expected to track not only the basic demographics of their students but also students' performance on a multitude of subject matter and high-stakes tests. In addition, data systems are preferably able to correlate student demographic data with test results in order to provide a school with a clearer picture of their student body and the various influences on students' academic performance.

Accountability

In response to public pressure from parents, lawmakers, and businesses, the education system is increasingly being held accountable for results. While most states have developed academic standards, experts agree that this development is just the first step in achieving better performance. Accountability is considered to be the true key to success in the education system (Harrington-Lueker, 1998). School accountability initiatives across the country include tactics such as tying school funding and faculty raises to student performance. However, in order for these accountability initiatives to work in producing the desired results, accurate systems and data to assess student performance are a necessity. Many states and districts are still far from achieving this type of robust data-collection automation (Scheer, 1999). Thus, many schools are attempting to put into place data systems that allow for complex tracking and correlation of inputs in order to more directly address their constituents' concerns.

School Improvement

In conjunction with increased accountability, pressure is being put on schools to formalize their overall quality improvements through the use of a standardized process. The National Study of School

Evaluation (NSSE), a nonprofit entity, has developed a standardized school improvement process represented by Figure 1 (1999).

In conjunction with the development of the standard process, the NSSE has developed a software program which assists in bringing a school through all six parts of the process. In order to successfully complete a school improvement plan, up-to-date and accurate data must be available. The NSSE software, therefore, is now being packaged together with other education data- management tools (DataPoint Plus Software System). As demonstrated by this product development, the integration of school improvement processes with data-collection systems is a growing trend.

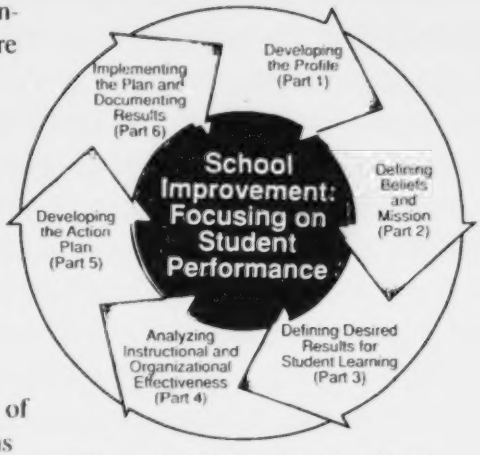
School Improvement: Focusing on Student Performance
Developing the Profile (Part 1)
Defining Beliefs and Mission (Part 2)
Defining Desired Results for Student Learning (Part 3)
Analyzing Instructional and Organizational Effectiveness (Part 4)
Developing the Action Plan (Part 5)
Implementing the Plan and Documenting Results (Part 6)

Figure 1. NSSE Standardized School Improvement Process

Technology

The use of technology in schools, both for educational and administrative purposes, is increasing at a rapid pace. All indicators suggest that this trend will continue in the next decade. *T.H.E. Journal* (2001) reports that money for technology in the schools for 2001-2002 is equal to or greater than 2000-2001 budgets for all states surveyed (31 states total). Survey results also indicate that regular integration of the Internet into the classroom by teachers is at an all-time high, and a majority of states now have a technology accountability plan in place.

The use of the Federal Communications Commission's (FCC's) E-Rate program, developed to increase school telecommunications capacity and Internet connectivity, has buoyed the entire technology infrastructure of the public schools over the past several years. The E-Rate, a $6 billion federal initiative, has been an effective leveler of the technology playing field for rural and economically disadvantaged schools. Although E-Rate was specifically designed to increase Internet access in the schools, many schools utilized the funding to improve their overall technological capacity. This increased capacity creates an opportunity for these schools to take advantage of other technology tools, such as educational and administrative software, which were previously beyond their system capabilities (Education Week, 2001).

As schools and communities become more wired, Internet interactivity is being heralded as the next wave in educational technology. The Internet is being used for both instructional assistance and access to Web-based data management tools. Teachers are able to take advantage of the many instructional tools on the market that seamlessly allow them to build the use of the Internet into a curriculum. School administrations are also taking advantage of the Internet by accessing software via an application service provider (ASP) model. This new distribution model decreases up-front and infrastructure costs typically associated with purchasing new software. In addition, through the use of educational portals and Intranets, schools are enhancing communication with students, teachers, and parents. New technologies now allow parents to check their child's grades, attendance records, and test scores via a password protected Internet connection.

While the majority of Internet use and software purchases are for instructional purposes, there is an increasing amount of time and money being spent on administrative technology. The Office of Educational Research and Improvement (2000) reports that while the majority of teachers (78%) use computers or the Internet for instruction, an increasing number (51%) also use computers or the Internet for administrative record keeping.

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Market Opportunity

Software Market

Continued growth is predicted in the worldwide software market over the next decade. The International Data Corporation (IDC) released a forecast which indicates software revenues will increase at a compound annual growth rate of more than 15% through 2004 (2000). The annual growth rate is predicted to be the strongest in the North American region (15.5%), and IDC forecasts that North America will account for more than half the software market's revenues over the next five years.

Education Market

According to the NEA, there are currently 17,000 school districts and 110,000 schools in the U.S., and these schools provide educational services to approximately 54 million K-12 students. Total expenditures on public education in the U.S. topped $330 billion in the 1998-1999 school year (National Center for Education Statistics, 2000). The mammoth size and disparate nature of this market has resulted in multiple market players targeting the education industry but few market leaders emerging. Decision making within the education market is spread out between the school, the district, and the state. This decentralized system creates an environment in which market domination is difficult. *T.H.E. Journal* (2001) reports that none of the states it surveyed regulate or proscribe the purchase of computer hardware, while only two of the states regulate or proscribe the purchase of administrative software. Although these purchases may not be proscribed, nine states have "approved lists" of hardware or software (Walsh, 2001). Thus, the point-of-sale for education products is often the schools themselves, creating a distribution dilemma for market players attempting to dominate the industry.

Education Technology

Despite exponential growth in the software and technology markets over the past decade, the education market has been relatively slow to take advantage of new technologies. While business enterprises have been capitalizing on the efficiencies provided by technology for several decades, the education market has just recently entered the technology market in earnest. Barriers to technology adoption in the education field include cost, central state/district control, slow decision making, inexperienced staff, and resistance to change. Due to these and other barriers, companies in the educational technology arena predict that only 50% of the potential market has been penetrated to date (Schreiner, 2001). Despite this currently low rate of penetration, use of technology in the schools is increasing exponentially. A study by Merrill Lynch & Co. estimates that annual spending on K-12 educational technology will rise to $6.9 billion by 2003 (Walsh, 2001).

In addition, the education technology industry is rallying to fix one of the major barriers to technology adoption by the schools—the incompatibility of education technology tools. This incompatibility requires duplicate data entry and results in a lack of information sharing across systems. The Schools Interoperability Framework (SIF) is an industry initiative to develop an open specification for ensuring that K-12 instructional and administrative software applications work together. SIF has participating members from more than 80 software publishers, technology providers and integrators, and schools and school districts. SIF recently announced the release of technical interoperability specifications that will enable data sharing among applications (Software and Information Industry Association, 2000). It is expected that the majority of players in the education technology industry will migrate to this standard, creating an even greater opportunity for schools to take advantage of the efficiencies of new technology.

Market Segments

The education technology market can be segmented into instructional and administrative technology tools. Quality Education Data (QED) reports that in the 1998-1999 school year, districts spent, on average, $121 per student on instructional technology and another $26 per student on administrative technology (2001). Thus, of the total per student educational technology budget, approximately 18% was dedicated to administrative needs. Given the projected $7 billion educational technology market, the administrative technology market can be projected to reach an estimated $1.2 billion in 2003.

Market Drivers

Market drivers for the administrative software market include nearly all of the macro trends outlined in the education market trend analysis section: data collection, standards, accountability, school improvement, and technology. The need for an efficient and effective system of collecting data, including student-testing results, is key to schools successfully meeting the challenge of accountability and school improvement. This market reality will drive school administrators toward the use of products that can meet all these needs in one streamlined system. Further integration of these issues—data, standards, accountability, and school improvement—will lead to the creation of more comprehensive administrative technology tools. In addition, as the technology infrastructure is upgraded (due to E-Rate and other funding sources) and technology applications become more usable and efficient for the schools (due to initiatives like the SIF), the adoption rate of administrative technology will only increase in the future.

Types of Software Applications

The majority of products in the administrative technology market can be categorized as student information systems (SIS), school administrative systems (SAS), or classroom management tools. These three types of software applications have been in existence in the education market for many years. SIS applications, which track individual student data, evolved to meet specific school needs and were often customized to fulfill state requirements or school specifics. SAS tools were originally developed to meet the needs of private schools and districts, including the tracking of administrative issues such as food service, transportation, and human resources. Classroom management applications were designed to assist teachers in tasks such as grading and curriculum development. These tools were often purchased directly by the teacher. Recent trends indicate an increase in the sophistication of these tools and in their use in the schools. In addition, these tools are becoming more integrated, and the distinctions across categories are blurring. Many companies in the education technology arena now offer modular solutions that cut across all three categories.

Market Players

The dominant market players in educational technology are NCS Pearson and Chancery Software. Both companies offer a core SIS/SAS product as well as additional modular applications and services. Chancery Software is a Canadian company that reported $20 million in annual sales in 2000 (Schreiner, 2001). Chancery offers its products worldwide, but 85% of its revenue comes from the U.S. It has recorded over 30% annual growth for the past three years, indicating a strong market pull for its products and an increase in market share. Chancery (2001) claims that more than 13 million schoolchildren and 1 million educators around the world benefit from its products. Chancery's primary products are Open District®, Win School®, and Mac School® student information systems; Library Pro® and Library Web® library management; and K12Planet.com school community portal.

NCS Pearson is the result of a recent acquisition of National Computing Systems Inc. by U.K.-based Pearson plc. NCS Pearson is a global information services company specializing in data collection, management, and interpretation. Pearson Education offers educational content, online

learning, and enterprise applications for schools. NCS Pearson (2001) claims they are the single largest provider of K-12 education enterprise tools in the country, serving nearly 40,000 U.S. schools. As its student information product, NCS Pearson offers the SASI™ III software for DOS-based PCs. This software tracks student demographics, attendance, discipline, grades, schedules, health, immunization, emergency, and parent/guardian records. In addition, NCS Pearson has introduced the SchoolCONNECTxp™ service, which allows schools to access its SASI product through an application service provider (ASP) model.

As education technology solutions become more commonplace, NCS Pearson and Chancery systems are emerging as the market standard. These companies have the expertise and the resources to offer a broad range of solutions that meet the demand. Their products will likely continue to evolve with the market.

Student Information Systems

There are multitudes of smaller companies that also offer solutions in the education technology market. Many of these offer only simple SIS applications without additional modules or functionality to assist schools in managing other instructional or administrative functions. The following are examples of companies that offer SIS applications:

- Eagle Software (www.eagle2000.com)
- Maplewood Computing (www.maplewood.com)
- MicroData (www.sturec.com)
- Olympia Computing Company, Inc. (www.schoolmaster.com)
- Power School (www.powerschool.com)
- Rediker Software (www.rediker.com)
- Surfside Company (www.surfsidesoftware.com)
- Tremont Software (www.tremontsoftware.com)

In addition to all the SIS solutions, there are many specific applications for the education market that may interface with the SIS. These tools are often offered as additional modules to an SIS. Examples include grading systems, curriculum development, scheduling, Internet content interface, standards and assessment tracking, and classroom management software.

School Administration Systems

SAS solutions constitute the other primary category of administrative software. As more and more schools are demanding an all-in-one solution, the traditional SAS providers are incorporating additional SIS and classroom management features. Figure 2 lists the main suppliers in this arena as of August 2001.

Figure 2. Main Suppliers of School Administration Systems

Company	Products	Functionality	Features	Price & Usage
Chancery Software www.chancery.com	Win School Mac School Open District	Student data management – both school and district level	Internet portal – value added service for parents and teachers, modular	N/A
ESchool Solutions www.eschoolsolutions.com	BusinessSmart SmartStaff SchoolSmart	Financial management, employment information, student info, and grades	Web enabled, district level	N/A 550 school districts
High Touch, Inc. www.hightouchinc.com	Pro/Star	Student, staff, and building data	Web browser connection allows parents to access info	N/A 270 schools
Integrated Systems Development www.isdwhq.com	Newgen	Financial, student, library, central database, food service, transportation, teaching	Modular product design – district level	N/A
Keystone Information Systems www.keyinfosys.com	Skools	Student administration, financial management, human resources	Relational database, site-based management, district controls	N/A
NCS Pearson www.ncs.com	CIMS G/T SchoolCONNECTxp SASIxp	Student records, payroll, financial, attendance, stocks, schedules	Modular product, ASP model	N/A
Oscar Software www.oscarsoftware.com	WinOSCAR5	Student data, staff data, student scheduling, grades, attendance, discipline, health, vehicle, food service	IBM compatible, multiple school years	$2,895 $495 per year
Pentamation Enterprises, Inc. www.pentamation.com	Open Series	Student and financial management	District level, engineering services	N/A
Skyward Inc. www.skyward.com	PaC-SMS	Student and financial management	District level, automatic reports, Internet enabled	Washington state – $20 million system, customized to 11 states
Software Technology, Inc. www.ssts.com	SSTSWin/2000 DAISI/2000	Student data, district-wide records, classroom management, health tracking, bookkeeping, transportation,	Internet enabled, Palm/OS compatible	All functions are modular – purchased separately, system-wide provider in Kentucky
Specialized Data Systems, Inc. www.specdatasys.com	School Office Connection	Student and financial data over the Internet	District office and school office products	N/A

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State Customization

In addition to the generic SIS/SAS solution providers, there are a host of providers that have customized solutions to meet the needs of particular states. These software developers have built their products around specific state education standards. Further, certain generic SIS/SAS solution providers offer versions of their software customized to complement the state standards. Certain states have also developed proprietary data management systems.

In an informal survey of state technology directors, it was determined that nearly every district does have some form of data management system in place in all its schools. However, the states range in their control and involvement in technology-solution decisions. State control falls roughly into three categories:

1. State-developed or proscribed system utilized by all schools;
2. State-approved list of software and hardware vendors; or
3. Complete district autonomy regarding technology decisions.

The following summarizes the information on data management systems gathered from the states:

- Delaware – implemented a statewide data management system developed by Pentamation. The state piloted curriculum development tools but did not find them successful.
- Florida – information is collected from the states and inputted into a statewide proprietary database system.
- Iowa – decisions are made on a regional level. Nine districts utilize a customized solution called ABACUS.
- Maine – all districts have a data collection system. Decisions regarding vendors are made at the district level.
- Massachusetts – all districts have a system to collect data. Decisions are controlled by the districts. Many of these systems are not designed to collect teacher and facility information.
- Michigan – districts use a state-approved list of vendors for all software, hardware, and technology consulting.
- Mississippi – all 152 public school districts have data management systems to collect information about students and teachers. Schools use software packages that are on the state-approved vendor list. The state also has a statewide data collection system called Mississippi Student Information System (MSIS).
- Montana – decisions are made at the local level.
- Nevada – all districts have a student management system; many have personnel management systems; facilities management is unknown. Decision making on vendors is made at the district level.
- New Hampshire – information is collected at the district level. Software usage includes the following:
  - Student information systems: OSIRIS 3.80%, SASSY 3.80%, Win School 7.83%, Mac School 24.83%, Other 52.57%
  - Financial management systems: Lotus 1.08%, Peachtree 0.22%, Microsoft Excel 19.05%, Quickbooks 10.17%, Quattro 0.22%, Other 54.98%
- New Jersey – 595 school districts have their own procedures and software for data management. Information is collected statewide on students and facilities.
- New Mexico – Accountability Data System requires all school districts to report information about students, staff, and classes. To capture this data, districts use student management software systems of their choice. The most commonly used vendor is NCS. Also, an Access database has been created to collect information from very small districts that cannot afford a student management system.

- North Carolina – currently using an NCS system statewide but is developing a new proprietary student information management system called NC WISE.
- South Carolina – in the process of converting all schools to the SASI system by NCS. All software licensure, installation, initial training, and technical support are provided by the state.
- Texas – decisions are made and implemented district wide. Many software companies have customized their products for the Texas market. An example is EDP Enterprise, Inc. (www.edpi.com).
- Utah – every district in the state has a data management system. The two most common are Power School and a state-developed system called SIS2000+.
- Vermont – most schools have systems that capture data; the state is considering the implementation of a statewide system.
- Virginia – all districts are using software to gather information on students and teachers. Districts are using SASI and Win School systems, although many are thinking of moving to PowerSchool. The state is also working on its own software program with the expectation that district information will feed into it.
- Wisconsin – All 426 districts have some form of automated student system but do not have information on staff and facilities. The state maintains an informal list of vendors; Skyward is the largest software provider in the state.

It appears that in those states where decision making control is held at the district level, customized products are the norm; whereas in those states that have more controlled technology environments, the national standard all-in-one products have the advantage. In the all-in-one niche, it appears that the dominant national players, NCS Pearson and Chancery, have the advantage due to their product depth and marketing resources.

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